

**SPARCstorage™  
MultiPack, MultiPack 2,  
FlexiPack and  
UniPack**

**Just the Facts**



## Copyrights

© 1997 Sun Microsystems, Inc. All Rights Reserved.

Sun, Sun Microsystems, the Sun logo, Sun Microsystems Computer Company, SunService, SunSpectrum, SunSpectrum Platinum, SunSpectrum Gold, SunSpectrum Silver, SunSpectrum Bronze, SunSolve Early Notifier Service, SunCD, NFS, Ultra, Ultra Enterprise, Solstice DiskSuite, Solaris, ELC, IPX, IPC, SunSwift, and SunOS, are trademarks, registered trademarks, or service marks of Sun Microsystems, Inc. in the United States of America and in other countries.

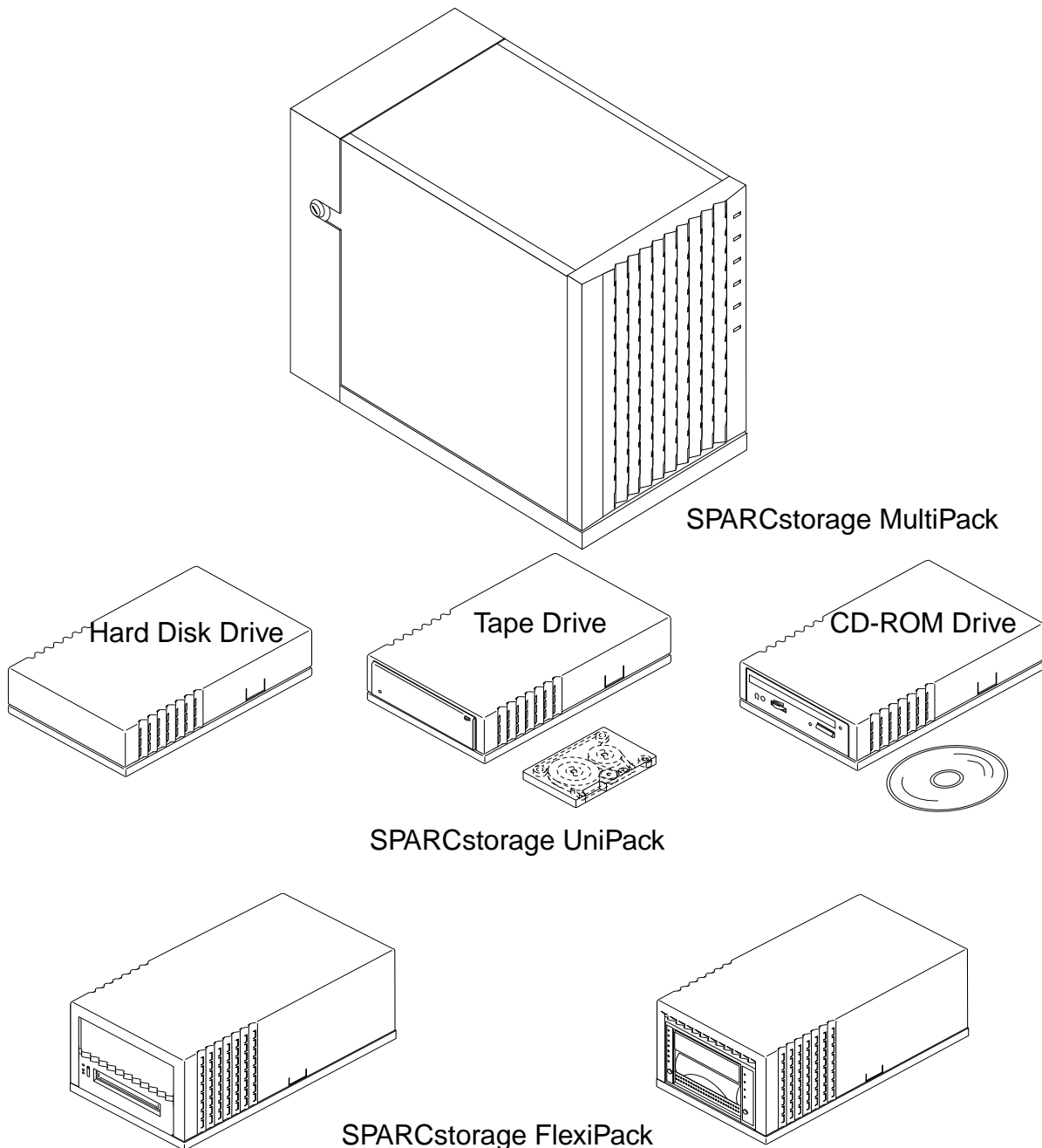
All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the United States and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.



# SPARCstorage™ Desktop Storage Enclosures

## Introduction

As the cost of magnetic media has dropped in recent years, the amount of on-line data has grown. Existing and emerging applications such as databases, imaging, and multimedia are demanding ever increasing capacity and performance on storage products. The SPARCstorage™ MultiPack, SPARCstorage™ MultiPack 2, SPARCstorage™ FlexiPack, and SPARCstorage™ UniPack are desktop storage systems that complement the Sun™ storage product line and bring a host of new competitive features to the desktop. The SPARCstorage™ Desktop Storage systems replace Sun's older Desktop Storage Module, Desktop Storage Pack, Desktop Backup Pack, and Multi-Disk Pack.



# SPARCstorage™ MultiPack

SPARCstorage™ MultiPack is a desktop, mass-storage enclosure that accommodates twelve 1-inch high, single connector attachment (SCA), fast/wide SCSI drives.

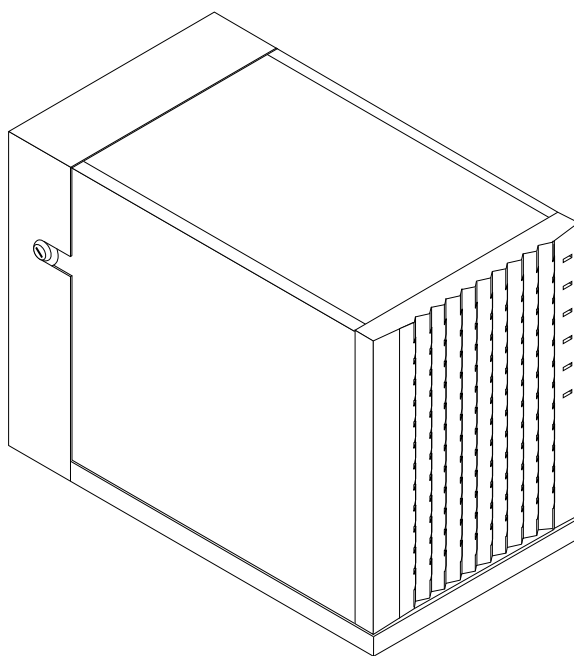
The MultiPack 2 accommodates six 1.6-inch high, single connector attachment (SCA), UltraSCSI drives.

The MultiPack and MultiPack 2 complement Sun's mass-storage product line and bring new competitive features to the desktop. Geographical SCSI addressing simplifies SCSI ID selection. Hot-pluggable drives using the new SCA-2 connector give customers higher reliability and greater ease of use than competitor's products. These products are necessary to bring the RAID application to the desktop in volume. The signature packaging complements both SPARCstorage™ UniPack, desktop workstations, and servers.

The MultiPack twelve drive enclosure is configured with two, six, or twelve 1-inch high 2.1 or 4.2-GB 7200-rpm Fast/Wide drives. The MultiPack 2 six drive enclosure is configured with two, four, or six 1.6-inch high 9.1-GB 7200-rpm UltraSCSI drives. Additional Xoption drives may be ordered to custom configure the MultiPack or MultiPack 2 to meet users' needs.

## Key Messages

- Maximum 54.6 GB of storage capacity
- Multiple UltraSCSI or fast/wide capable drives in a single desktop enclosure
- Lowest cost/MB option
- Excellent price/IOPS option
- Hot-swappable drives with multiple active spindles
- Geographical addressing
- Easily serviced and expanded



# SPARCstorage MultiPack (cont.)

## Availability

- The SPARCstorage twelve drive MultiPack began shipping January 1996.  
4.2-GB 7200-rpm drives began shipping in February 1997
- The SPARCstorage six drive MultiPack 2 began shipping July 1997.  
9.1-GB 7200-rpm drives began shipping in March 1997

## Target Users

- Customers needing large capacity add-on storage and high performance on the desktop
- Sun installed base customers requiring additional storage
- Customers in the growing database, imaging, and multimedia markets

## Key Features and Benefits

### • Features

- Maximum 54.6 GB capacity
- Fast/wide SCSI (MultiPack)
- UltraSCSI (MultiPack 2)
- Twelve-drive MultiPack
- Six-drive MultiPack 2
- Hot-plug ready drives
- Single connector drives
- Geographical SCSI addressing
- Key locking door

### • Benefits

- Easy modular growth for desktop servers and power user workstations
- 16-bit data bus provides users with up to 20-MB/sec burst transfer rates.
- Sustained transfer rates of over 17-MB/sec
- 16-bit data bus provides users with up to 40-MB/sec burst transfer rates.
- Sustained transfer rates of over 18.5-MB/sec
- Provides the highest IOPS/dollar
- Multiple active spindles, overlapped seeks, and optimum SCSI bus bandwidth allows the highest performance possible
- Provides the lowest cost/MB
- On-line, user serviceable drives make it easy to configure and service MultiPack and MultiPack 2
- Offers better reliability with fewer internal cables and connections
- Simplifies address selection
- Deters inadvertent removal of devices and protects user's data

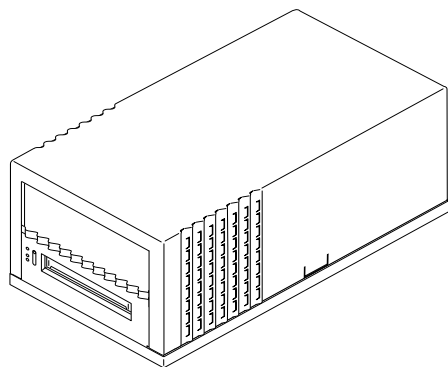
# SPARCstorage™ FlexiPack

SPARCstorage FlexiPack is a desktop device enclosure that accommodates either one full-height or two half-height removable media devices. SPARCstorage FlexiPack desktop storage products offer external storage and backup solutions for Sun's workstations and servers. These products are easily connected to a workstation or server through the built-in SCSI host adapter port or through a SCSI/SBus adapter.

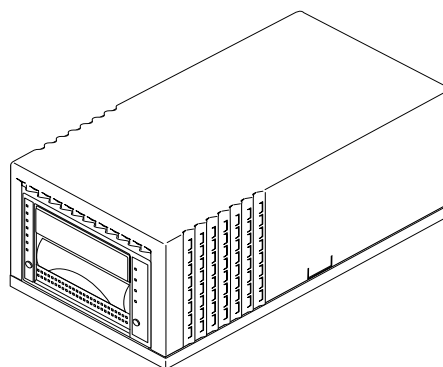
## Key Messages

- Accommodates 5.25" half-height or full-height devices with industry standard bezels
- Can configure different tape drives and CD-ROM drives within the same unit
- Can accommodate both Fast SCSI and Fast/wide SCSI devices in the same unit
- Narrow footprint
- Easy to open and service
- Acoustically engineered
- Available with the following devices:
  - SPARCstorage DLT7000
  - SPARCstorage DLT4000
  - 72-144-GB 4mm DDS-3 Autoloader
  - 12-24-GB 4mm DDS-3 Tape Drive
  - 4-8-GB 4mm DDS-2 Tape Drive
  - 20-40-GB 8mm Tape Drive
  - 7-14-GB 8mm Tape Drive
  - SunCD™ 12 CD-ROM drive

The FlexiPack complements the storage product line and brings new competitive features to the desktop. While it was designed with the intention of holding full-height devices like DLT drives, it's incredible flexibility enables the user to have multiple configurations which could include multiple half-height tape drives, a tape drive and a CD-ROM, or a 4mm DDS-3 autoloader. Users now have the ability to store up to 144-GB on the desktop. The signature packaging complements SPARCstorage MultiPack, SPARCstorage MultiPack 2, SPARCstorage UniPack, desktop workstations, and servers.



FlexiPack with half-height drive  
(lower bay) and filler panel (upper bay)



FlexiPack with full-height  
DLT7000 drive

# SPARCstorage FlexiPack (cont.)

## Availability

- The SPARCstorage FlexiPack began shipping configurations with the SPARCstorage DLT7000, SPARCstorage DLT4000, and the 72-144GB 4mm DDS-3 autoloader on March 25, 1997.
- All other configurations began shipping on May 23, 1997.

## Target Users

External devices provide additional desktop storage with fast/wide SCSI performance enabling double the throughput of typical fast SCSI devices. The digital world is driving up storage capacity requirements because image and graphics data files are typically very large. The higher capacity and flexibility of the FlexiPack enables significant desktop and desktide backup/archive ability. The fast/wide devices support burst transfer rates of 20-MB/second and data rates up to 10-MB/second per device depending on how well the data can be compressed.

The desktop backup solutions have made advances in capacity and performance. Unattended backups of up to 144-GB (compressed capacity if the data can be compressed 2:1) are now possible using the new DDS-3 autoloader with 6 cartridges in the FlexiPack. The 4mm (DDS-3 and DDS-2) tape drives as well as CD-ROM are viable solutions for desktop backup as well as data interchange. The 8mm tape drives and DLT drives are higher-end solutions for the desktop and can also serve desktop and workgroup servers because of their performance and capacity.

## Key Features and Benefits

### • Features

- Configuration flexibility
- Fast/wide SCSI capable
- Narrow footprint
- Easy to open enclosure
- Acoustically engineered

### • Benefits

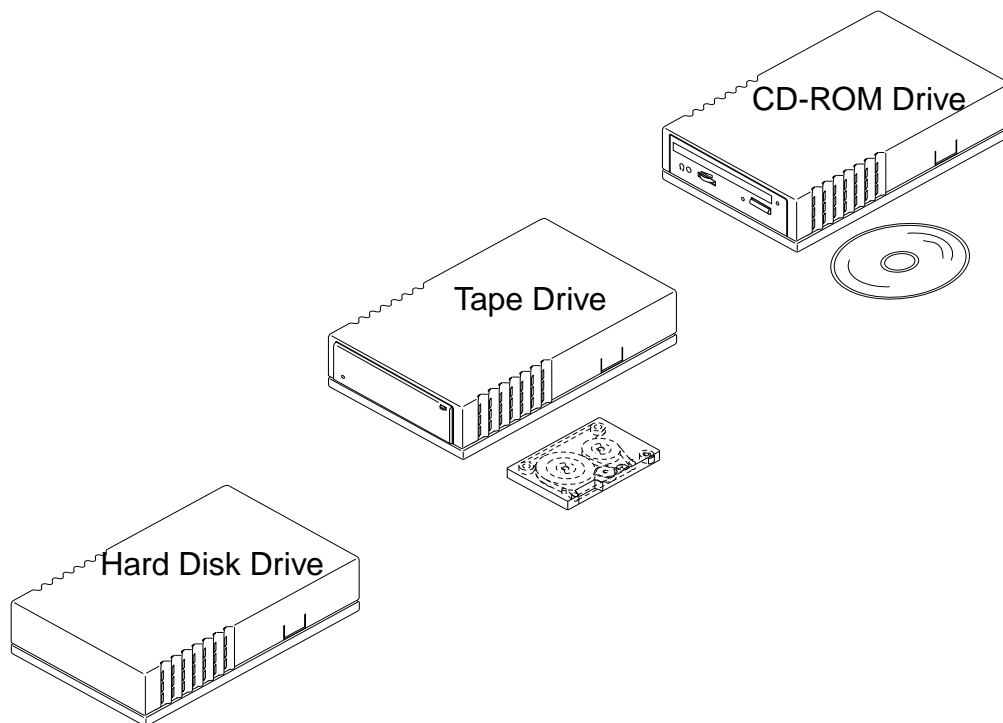
- Can configure 1 full-height drive in a FlexiPack or multiple options of different half-height tape drives and CD-ROM drives to meet users needs
- Can accommodate Fast/Wide and Fast/Narrow devices within the same enclosure
- Provides 20-MB/sec. burst rates, twice that of the fast/narrow enclosures making it ideal for transferring large sequential files
- Saves desktop space (same width as the SPARCstorage UniPack)
- Saves service time and easily customer serviceable
- Makes the office quieter when fan operation is not necessary

# SPARCstorage™ UniPack

SPARCstorage UniPack desktop storage products offer external storage and backup solutions for Sun's workstations and servers. These products are easily connected to a workstation or server through the built-in SCSI host adapter port or through a SCSI/SBus adapter.

## Key Messages

- Fast/wide SCSI capable
- Narrower footprint
- Easy to open and service
- Single connector attachment (SCA) disks
- Acoustically engineered
- Available with the following devices:
  - 2.1-GB fast/wide SCSI-2, 7200-RPM hard disk
  - 4.2-GB fast/wide SCSI-2, 7200-RPM hard disk
  - 9.1-GB fast/wide SCSI-2, 7200-RPM hard disk
  - 2.5-GB QIC tape drive
  - 4- to 8-GB (compressed) 4 mm DDS-2 tape drive
  - 12- to 24-GB (compressed) 4mm DDS-3 tape drive
  - 7- to 14-GB (compressed) 8 mm tape drive
  - 20- to 40-GB (compressed) 8mm tape drive
  - SunCD™ 4 CD-ROM drive





# SPARCstorage UniPack (cont.)

## Availability

The SPARCstorage UniPack began shipping in September 1995.

## Target Users

External disks provide additional on-line storage with increased performance for NFS™, multimedia, database, and Internet applications. Image and graphics data files are typically very large, driving up disk capacity requirements in the ever expanding digital world. The higher performance of the UniPack will improve application performance because there is more data movement and processing. The fast/wide disks support burst transfer rates of 20-MB/sec and data rates averaging 8-MB/sec per disk. It is possible to scale the storage performance on a bus using the new higher performance fast/wide drives to a sustained transfer rate of over 17-MB/sec with multiple spindles.

The desktop backup solutions have made advances in capacity and performance. Unattended backups of up to 40 GB (compressed) are now possible. The 2.5-GB QIC drive is now a viable solution for backup as well as data interchange. The 4- to 8-GB and 12- to 24-GB, 4 mm tape drives will continue to be a popular backup solution for the desktop. The 7- to 14-GB and 20- to 40-GB, 8 mm tape drive is a high-end solution for the desktop because of the performance and capacity.

## Key Features and Benefits

### • Features

- Fast/wide SCSI capable disks
- Narrower footprint
- Easy to open enclosure
- Single connector disks
- Acoustically engineered

### • Benefits

- Provides 20-MB/sec burst rates, twice that of the fast/narrow enclosures, making it ideal for transferring large sequential files
- Saves desktop space
- Saves service time
- Makes it easier to replace disks; one connection for power, interface and SCSI ID
- Improves system reliability; fewer internal cables used
- Makes the office quieter when fan operation is not necessary

# SPARCstorage™ MultiPack System Architecture

## SPARCstorage MultiPack Technology Overview

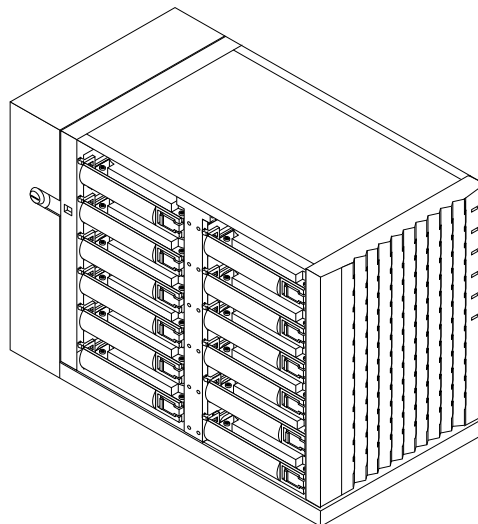
The SPARCstorage™ MultiPack drive enclosure uses 3.5-inch form factor, fast/wide SCA-2 disk drives. The maximum number of disks per enclosure is twelve 1-inch high drives. The MultiPack 2 uses 3.5-inch form factor, UltraSCSI disk drives. The maximum number of disks per enclosure is six 1.6-inch high drives. The MultiPack and MultiPack 2 enclosures cannot share drives because each uses a different backplane.

For UltraSCSI functionality, the host or host adapter connected to the MultiPack 2 unit must be capable of UltraSCSI speeds. A MultiPack 2 enclosure can be connected to a fast wide or narrow SCSI capable host adapter, but in such a case, the MultiPack 2 unit performs at the lower speed.

## Geographical Addressing

Each drive bay in the MultiPack and MultiPack 2 is preassigned a SCSI ID to eliminate the chance of setting duplicate IDs. This feature also eliminates using external ID switches, minimizes the risk of breaking internal cables and increases the reliability of the drive enclosure.

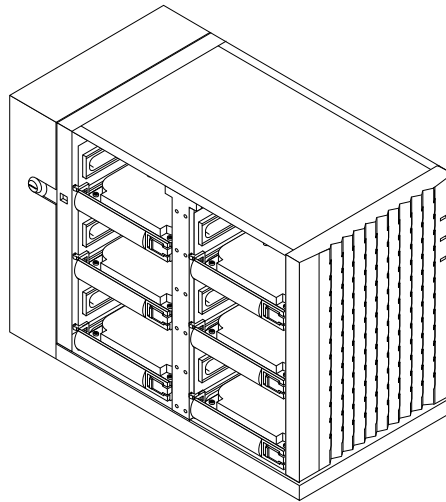
Below are the assigned target SCSI IDs for the two types of the MultiPack subsystems.



- MultiPack twelve disk enclosure: preset SCSI IDs to 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14 and 15.

SCSI ID 2	SCSI ID 10
SCSI ID 3	SCSI ID 11
SCSI ID 4	SCSI ID 12
SCSI ID 5	SCSI ID 13
SCSI ID 8	SCSI ID 14
SCSI ID 9	SCSI ID 15

# SPARCstorage MultiPack System Architecture (*cont.*)



The MultiPack 2 has two sets of pre-selected SCSI IDs. The user can choose to use IDs 1, 2, 3, 4, 5, and 6 or IDs 9, 10, 11, 12, 13, and 14. A switch allows customers to select IDs 1–6 or IDs 9–14, allowing daisy chaining of six drive MultiPack 2's on a wide bus.

- MultiPack 2 six drive enclosure; Address ID switch in the 1–6 position

SCSI ID 1	SCSI ID 4
SCSI ID 2	SCSI ID 5
SCSI ID 3	SCSI ID 6

- MultiPack 2 six drive enclosure; Address ID switch in the 9-14 position

SCSI ID 9	SCSI ID 12
SCSI ID 10	SCSI ID 13
SCSI ID 11	SCSI ID 14

## Power Supply

The 180 Watt auto-ranging power supply provides enough power for even the higher powered 7200-RPM drives.

## Easy To Open and Service

The MultiPack and MultiPack 2 are designed with a key locking door that lets users quickly access the drive bays while protecting valuable data from inadvertent removal. Engaging the lock is not required to keep the door shut.

# SPARCstorage MultiPack System Architecture (*cont.*)

## Tech Facts

The SPARCstorage MultiPack disk system has the following performance specifications.

Performance Specifications	2.1-GB	4.2-GB
Average seek read	9.5 ms	9.5 ms
Average seek write	10.5 ms	10.5 ms
Average latency	4.17 ms	4.17 ms
Interface data transfer rate	20-MB/sec	20-MB/sec
HDA data transfer rate	9-MB/sec	9-MB/sec
Rotational speed	7200-RPM	7200-RPM
Buffer	512-KB	512-KB

The SPARCstorage MultiPack 2 disk system has the following performance specifications.

Performance Specifications	9.1-GB
Average seek read	9.5 ms
Average seek write	10.7 ms
Average latency	4.17 ms
Interface data transfer rate	40-MB/sec
HDA data transfer rate	10-MB/sec
Rotational speed	7200-RPM
Buffer	512-KB

# SPARCstorage MultiPack System Architecture (*cont.*)

---

## Physical Specifications

Height	225 mm / 8.86 in.
Width	190 mm / 7.48 in.
Depth	395 mm / 15.55 in.
Weight (Enclosure)	6.12 kg / 13.5 lb.
Weight (with 12 x 4.2 GB)	12.7 kg / 28 lb. 0.7 kg / 1.5 lb. per 4.2 GB drive
Weight (with 6 x 9.1 GB)	12.7 kg / 28 lb. 0.9 kg / 2.1 lb. per 9.1 GB drive

## Electrical Specifications

Input voltage	100–240 VAC
Maximum input current	3.0 amp
Maximum input VA	300 VA
Maximum input power	265W
Maximum heat output	900 BTU/hour

# SPARCstorage™ FlexiPack System Architecture

## SPARCstorage™ FlexiPack Technology Overview

The SPARCstorage™ FlexiPack device enclosure is designed for either one full-height or two half-height removable media devices.

### Highly Configurable

Designed to hold any 2 half-height devices, users can configure numerous options within a FlexiPack including different assortments of tape drives or a combination of a tape drive and a CD-ROM. In addition, if the users prefers, a full-height device such as the SPARCstorage DLT7000 tape drive or DDS-3 autoloader can be placed in the FlexiPack.

### Fast/wide SCSI Capable

The FlexiPack device is designed for 20-MB/sec. fast/wide SCSI-2 tape drives with two 68-pin SCSI P-type connectors. However, both *Fast/Wide* and *Fast* SCSI-2 modes are supported even within the same enclosure. For instance, a customer might want a 20-40 GB 8mm tape drive and the SunCD 12 CD-ROM drive within the same FlexiPack. This is a valid (and common) configuration even though the 8mm drive uses a Fast/Wide SCSI connection and the CD-ROM drive uses a Fast/Narrow connection. The drive connections are all made internally and then the FlexiPack has a 68-pin (Fast/Wide) SCSI connection out the back of the enclosure.

### Auto SCSI Termination

Auto termination eliminates the need for external terminators. Circuitry in the enclosure automatically terminates an 8-bit or 16-bit SCSI bus if the FlexiPack unit is the last device on the bus. It also *split terminates* in the middle of the bus and adapts to the change of 16-bit to 8-bit bus.

### Narrow Footprint

The width of the FlexiPack is the same as the UniPack. The narrow width allows for more effective use of desktop space. The dimensions are 190mm (7.48 in.) wide, 392mm (15.43 in.) deep, and 134mm (5.28 in.) high.

### Easy to Open and Service

The FlexiPack opens easily once the lock block on the rear is removed. The enclosure lid is removed by depressing the two latches on either side and lifting up. Removable media devices are mounted on a metal sled that makes them very easy to slide out.

### Acoustically Engineered

New fan speed control circuitry helps make the office environment quieter while ensuring drive reliability in hotter environments.

# SPARCstorage FlexiPack System Architecture (*cont.*)

## Tech Facts

Below are product features of the FlexiPack drive and removable subsystems.

<b>Tape Drive Options</b>	<b>DLT7000</b>	<b>DLT4000</b>	<b>7-14-GB 8mm</b>	<b>20-40-GB 8mm</b>
Formatted Capacity Uncompressed	35-GB	20-GB	7-GB	20-GB
Formatted Capacity Compressed*	70-GB @ 2:1	40-GB @ 2:1	14-GB @ 2:1	40-GB @ 2:1
Tape Speed	100+ ips	100+ ips	0.872 ips	0.43 ips
Burst Data Rate (max.)	12 MB/sec (asynch) 20MB/sec (synch)	10-MB/sec.	3-MB/sec.	7-MB/sec (asynch) 20-MB/sec (synch/native)
Transfer Rate Uncompressed	5-MB/sec.	1.5-MB/sec.	500-KB/sec.	3-MB/sec.
Transfer Rate Compressed*	10-MB/sec.	3-MB/sec.	1-MB/sec.	6-MB/sec.
Buffer			256-KB	4-MB

<b>Tape Drive and CD-ROM</b>	<b>4mm DDS-3 Autoloader</b>	<b>4mm DDS-3</b>	<b>4mm DDS-2</b>	<b>SunCD™ 12</b>
Formatted Capacity Uncompressed	72-GB	12-GB	4-GB	656-MB
Formatted Capacity Compressed*	144-GB @ 2:1	24-GB @ 2:1	8-GB @ 2:1	n/a
Tape Speed	0.41 ips	0.41 ips	0.96 ips	n/a
Burst Data Rate (max.)	3-MB/sec. (asynch) 10-MB/sec. (synch)	3-MB/sec. (asynch) 10-MB/sec. (synch)	5-MB/sec.	n/a
Transfer Rate Uncompressed	1-MB/sec.	1-MB/sec.	550-KB/sec.	1.8 MB/sec.
Transfer Rate Compressed*	2-MB/sec.	2-MB/sec	1.1-MB/sec.	n/a
Buffer	2-MB	2-MB	1-MB	256-KB

# SPARCstorage FlexiPack System Architecture (*cont.*)

## Physical Specifications

Height	134mm (5.28 inches)
Width	190mm (7.48 inches)
Depth	392mm (15.43 inches)
Weight DLT7000	15 lbs. 5 oz.
Weight DLT4000	14 lbs. 12 oz.
Weight DDS-3 Autoloader	14 lbs. 3 oz.
Weight 20-40-GB 8mm Tape Drive	11 lbs. 14 oz.
Weight 7-14-GB 8mm Tape Drive	11 lbs. 11 oz.
Weight DDS-3 Tape Drive	11 lbs. 8 oz.
Weight DDS-2 Tape Drive	11 lbs. 3 oz.
Weight SunCD12	11 lbs. 5 oz.

## Electrical Specifications

Input Voltage	100–240 VAC
Maximum Input Current	0.6 Amp
Maximum Input VA	60 VA at 100 VAC, 82 VA at 240 VAC
Maximum Input Power	36.5 W
Maximum Heat Output	125 BTU/hour



# SPARCstorage™ UniPack System Architecture

## SPARCstorage™ UniPack Technology Overview

The SPARCstorage UniPack single device enclosure is designed for either 3.5-inch form factor, fast/wide SCA-2 disk drives or removable devices.

### Fast/wide SCSI Capable

The UniPack device is designed for 20-MB/sec, fast/wide SCSI-2 disk drives with two 68-pin SCSI P-type connectors. However, both *fast/wide* and *fast* SCSI-2 modes are supported. The tape drives are fast SCSI-2 only devices.

### Auto SCSI Termination

Auto termination eliminates the need for external terminators. Circuitry in the enclosure automatically terminates an 8-bit or 16-bit SCSI bus if the UniPack unit is the last device on the bus. It also *split terminates* in the middle of the bus and adapts to the change of 16-bit to 8-bit bus.

### Narrower Footprint

The footprint is smaller than the Desktop Storage Pack. The narrower width allows for more effective use of desktop space. The new dimensions are 190 mm (7.5 in.) wide, 310 mm (12.2 in.) deep, and 70 mm (2.8 in.) high.

### Easy to Open and Service

The UniPack opens easily once the lock block on the rear is removed. The enclosure lid is removed by depressing the two latches on either side and lifting up. Disk and tape drives are mounted on a metal sled that makes them very easy to slide out.

### Single Connector Attachment (SCA) Disks

All disk drives use the single connector attachment (SCA) interface currently used in the SPARCstation™ 4, SPARCstation 5, SPARCstation 20, Ultra™ 1 and 2, as well as Ultra™ Enterprise™ and SPARCserver™ 1000(E) systems. The SCA interface eliminates the need for internal cables, improving reliability and serviceability. The tape drives will continue to use the standard three cable/connector interface.

### Acoustically Engineered

New fan speed control circuitry helps make the office environment quieter while ensuring drive reliability in hotter environments.

# SPARCstorage UniPack System Architecture (*cont.*)

## Tech Facts

Below are product features of the UniPack drive and removable subsystems.

Disk Drives	2.1 GB	4.2 GB	9.1 GB
Average seek read	9.5 ms	9.5 ms	9.5 ms
Average seek write	10.5 ms	10.5 ms	10.7 ms
Average latency	4.17 ms	4.17 ms	4.17 ms
Interface data transfer rate	20-MB/sec.	20-MB/sec	20-MB/sec
HDA data transfer rate	9-MB/sec	9-MB/sec	9-MB/sec
Rotational speed	7200-RPM	7200-RPM	7200-RPM
Buffer	512-KB	512-KB	512-KB

Tape Drive and CD-ROM	4mm DDS-3	4mm DDS-2	20- to 40-GB 8mm	7- to 14-GB 8mm
Formatted capacity (uncompressed)	12-GB	4-GB	20-GB	7-GB
Formatted capacity (compressed)	24-GB	8-GB @ 2:1	40-GB @ 2:1	14-GB @ 2:1
Tape speed	0.41 ips	0.47 ips	0.43 ips	0.872 ips
Burst data rate (max.)	10-MB/sec (synch) 3-MB/sec (asynch)	5-MB/sec	10-MB/sec (synch) 7-MB/sec (asynch)	5-MB/sec
Transfer rate (uncompressed)	1-MB/sec	550-KB/sec	3-MB/sec	500-KB/sec
Transfer rate (compressed)	2 MB/sec	1100-KB/sec	6-MB/sec	1-MB/sec
Buffer	2-MB	1-MB	4-MB	1-MB

# SPARCstorage UniPack System Architecture *(cont.)*

## Tech Facts *(cont.)*

Tape Drive and CD-ROM	2.5-GB QIC	SunCD™ 12
Formatted capacity (uncompressed)	2.5-GB*	656-MB
Formatted capacity (compressed)	n/a	n/a
Tape speed	70.9 ips	n/a
Burst data rate (max.)	3-MB/sec	4.2-MB/sec
Transfer rate (uncompressed)	300-KB/sec	1.8-MB/sec
Transfer rate (compressed)	n/a	n/a
Buffer	256-KB	256-KB

(\*) Using 2.5-GB QIC tapes

# SPARCstorage UniPack System Architecture (*cont.*)

## Physical Specifications

Height	70 mm / 3.8 in.
Width	190 mm / 7.5 in.
Depth	310 mm / 12.2 in.
Weight (enclosure)	2.30 kg / 5 lb (UniPack disk) 2.25 kg / 5 lb (UniPack removable)
Weight 2.1-GB 7200-RPM	0.5 kg / 1.12 lb (device alone)
Weight 4.2-GB 7200-RPM	0.6 kg / 1.3 lb (device alone)
Weight 9.1-GB 7200-RPM	1.0 kg / 2.3 lb (device alone)
Weight 7- to 14-GB 8 mm tape drive	1.2 kg / 2.6 lb (device alone)
Weight 20- to 40-GB 8 mm tape drive	1.36 kg / 3.0 lb (device alone)
Weight 4 mm DDS-3 tape drive	1.0 kg / 2.2 lb (device alone)
Weight 4 mm DDS2 tape drive	0.8 kg / 2.0 lb (device alone)
Weight 2.5-GB QIC tape drive	1.1 kg / 2.4 lb (device alone)
Weight SunCD™ 12	0.9 kg / 1.9 lb (device alone)

## Electrical Specifications

Input voltage	100–240 VAC
Maximum input current	0.6 amp
Maximum input VA	60 VA at 100 VAC, 82 VA at 240 VAC
Maximum input power	36.5W
Maximum heat output	125 BTU/hour

# Hot Plug Capability

## Key Innovation: Single Connector Drive

Sun Microsystems co-invented a new type of drive connector scheme called the single connector attachment (SCA). In the SCA design, all electric signals for SCSI interface, power, and jumpers are passed through one small connector, which is integrated directly onto the disk drive's printed circuit board. The drive plugs directly into the MultiPack or MultiPack 2 backplane with no cables or jumpers to set. This improves reliability and serviceability.

The second generation version of this connector, called the SCA-2, includes hot-plug features. Longer hot-plug pins ensure the drive is grounded first before signal pins make contact. The drives also reserve two pins to carry signals that indicate whether all pins successfully connect. The single connector design has been made available to the disk industry's Small Form Factor Committee and is produced by multiple disk drive manufacturers (spec SFF8046).

Many disk subsystems offer hot-plug disks. Unfortunately, they are inherently unreliable and cumbersome. To be pluggable, they enclose a standard disk drive in a metal or plastic canister. Internal connections use multiple flex cables, jumpers, and other wires—parts that increase the likelihood of failures. These pluggable drive schemes cause a disk subsystem to be *less* reliable.

Therefore, SCA-2 gives Sun customers many benefits, the most important being higher reliability. Using SCA-2 provides other valuable advantages: a) it is one of the keys to the higher storage density of the MultiPack models, b) it costs less than other drive carrier schemes, and c) it is more customer serviceable. With other pluggable drive schemes, removing the failed drive from the carrier and replacing it with a new drive is tedious and fraught with risks for mistakes.

## Hot Plug Defined

Annex A of the SCSI-3 Parallel Interface (SPI) document draft proposal (X3T10/855D revision 15a *Removal and insertion of SCSI devices*) outlines four cases of plugging devices.

- Case 1: Power-off during removal or insertion
- Case 2: RST signal asserted continuously during removal or insertion
- Case 3: Current I/O processes not allowed during insertion or removal
- Case 4: Current I/O processes allowed during insertion or removal

# Hot-Plug Capability (cont.)

## Hot Plug in the Sun™ Environment

The MultiPack models conform to all SCSI-3 SPI specifications for Case 4 at the disk interface level. Activity on the SCSI bus can continue without interruption while a device is being removed or inserted. Drives should not be pulled out randomly. The MultiPack and MultiPack 2 designs are intended to allow users to replace failed drives in redundant (mirrored or RAID) configurations. If there is activity against a drive, users need to stop the activity before removing the drive. This can be done without bringing down the operating system or powering down the MultiPack. The Installation Supplement of the SPARCstorage MultiPack Product Note contains detailed information for removing, replacing, and adding drives.

## Hardware Considerations

Both MultiPack models fully supports hot plugging. The SCA-2 drive connector eliminates the use of internal drive cables and allows for hot plugging drives. Sun has done extensive electrical evaluation of the hot plug operation to prove that there is no signal or power disturbance during hot plug. However, Sun cannot guarantee that hot plugging will never result in the corruption or loss of data any more than Sun can guarantee that any SCSI bus will never experience a double-bit error (undetectable via parity detection). In mission critical data areas, it is still recommended that a user suspend all operations over the SCSI bus during hot plug.

## Software Considerations

When supported by high availability software solutions (such as SPARCstorage Volume Manager or Solstice™ DiskSuite™) the disk drives are hot-pluggable. When data is not protected by a RAID implementation, outstanding requests to the removed device are not guaranteed to complete. The SPARCstorage MultiPack Product Note has detailed information for various scenarios, including instructions for removing, replacing, and adding drives.

## Configuration Considerations

Both MultiPack models use geographic addressing, which means that devices inserted into the enclosure assume the SCSI ID of the slot occupied. If a device is removed from the ID 4 slot and replaced by a new drive, the new drive ID is 4.

## Hot Plug Capability (cont.)

### Hot Plug in the Solaris™ Environment

Several levels of device plugging are defined in the Solaris™ environment. The operations required to support these features are listed below.

Hot Reconfiguration	Tasks
Adding disk drive to increase capacity	<ul style="list-style-type: none"><li>-Quiesce the SCSI bus that the drive will be inserted into</li><li>-Select a slot for the new disk drive</li><li>-Add the disk drive</li><li>-Configure the Solaris environment to recognize the drive</li><li>-Configure the application to recognize the drive</li></ul>
Replacing a failed disk drive while the system is running	<ul style="list-style-type: none"><li>-Identify the failed drive at the system level</li><li>-Detach the drive from the application using it</li><li>-Map the device to a physical drive and determine its physical location</li><li>-Quiesce and spin down the drive</li><li>-Remove the drive</li><li>-Insert the replacement drive</li><li>-Configure the replacement drive to be similar to the failed drive at the system level</li><li>-Reattach the replacement drive to the application</li><li>-Rebuild the data on the new drive if possible</li></ul>
Removing a disk drive from a system that no longer needs it	<ul style="list-style-type: none"><li>-Identify the drive to be removed</li><li>-Detach the drive from any applications that are using it</li><li>-Map the device to a physical drive and determine its location</li><li>-Quiesce and spin down the drive</li><li>-Remove the drive</li><li>-Reconfigure the Solaris environment to recognize that the drive is no longer available</li></ul>

# System Requirements

## MultiPack

The SPARCstorage six drive MultiPack 2 subsystem is supported on the following systems.

SPARCstation 1/1+ *	SPARCstation 4	Ultra 140/170E
SPARCstation IPC™ *	SPARCstation 5	Ultra 140E/170E/200E
SPARCstation ELC™	SPARCstation 10	Ultra 2
SPARCstation 2	SPARCstation 20	Ultra 30
SPARCstation IPX™	SPARCserver 630/670™ *	Ultra Enterprise 150
SPARCstation LX	SPARCserver 1000(E)	Ultra Enterprise 3/4000
SPARCclassic™		

The SPARCstorage twelve drive MultiPack subsystem is supported on the following systems.

SPARCstation 4 **	SPARCserver 630/670 **	Ultra 2
SPARCstation 5 **	SPARCserver 1000(E) **	Ultra 30
SPARCstation 10 **	Ultra 140/170 **	Ultra Enterprise 150 **
SPARCstation 20 **	Ultra 140E/170E/200E	Ultra Enterprise 3/4000 *

(\*) Not supported on the on-board host adapter. An FSBE/S or Fast/Wide HBA is required.

(\*\*) A fast/wide host adapter such as SWIS/S or SunSwift is required.



# System Requirements (cont.)

## FlexiPack

The SPARCstorage FlexiPack configurations are supported according to the platforms supported by each specific drive used in the FlexiPack. However, in general the SPARCstorage FlexiPack devices are supported on the following Sun systems.

SPARCstation 4	Netra(TM) i5	Netra j1200
SPARCstation 5	Netra i140	Netra NFS(TM) 150
SPARCstation 10	Netra j145	Sun Ultra Enterprise 150
SPARCstation 20	Netra i170E	SPARCserver 1000(E)
Sun Ultra/Enterprise 1	Netra i150	Sun Ultra Enterprise 3000
Sun Ultra/Enterprise 2	Netra i1200	Sun Ultra Enterprise 4000

SPARCstorage FlexiPack configurations for the SPARCstorage DLT7000, SPARCstorage DLT4000, and 20-40-GB 8mm tape drives are also supported on the:

SPARCcenter 2000(E)	Sun Ultra Enterprise 6000
Sun Ultra Enterprise 5000	Sun Ultra Enterprise 10000

## UniPack

The SPARCstorage UniPack drives are supported on the following systems:

SPARCstation 1/1+ *	SPARCclassic	SPARCserver 1000(E)
SPARCstation IPC *	SPARCstation 4	Ultra 140/170
SPARCstation ELC	SPARCstation 5	Ultra 140E/170E/200E
SPARCstation 2	SPARCstation 10	Ultra 2
SPARCstation IPX	SPARCstation 20	Ultra Enterprise 150
SPARCstation LX	SPARCserver 630/670 *	Ultra Enterprise 3/4000

(\*) Not supported on the onboard host adapter. An FSBE/S is required.

# System Environment

## Environment Specifications

Specification	SPARCstorage MultiPack and SPARCstorage MultiPack 2	SPARCstorage UniPack, FlexiPack
AC power	100–240 VAC, 47–63 Hz	100–240 VAC, 47–63 Hz
Operating range	5°C to 40°C (41°F to 104°F), 20–80 percent RH, max wet bulb 26 percent	Disk drives (UniPack only): 5°C to 40°C (41°F to 104°F), 20–80 percent RH, max wet bulb 26 percent  Removable devices (UniPack): 10°C to 35°C (50°F to 95°F), 20–80 percent RH, max wet bulb 26 percent  Removable devices (FlexiPack): 10°C to 35°C (50°F to 95°F), 20–80 percent RH, 27°C max wet bulb
Non-operating range	-40°C to 60°C (-40°F to 140°F), 10–93 percent RH, noncondensing	Disk drive, tapes, and SunCD 12 (UniPack): -40°C to 60°C (-40°F to 140°F), 10–90 percent RH, noncondensing  Removable devices (FlexiPack): -30°C to 60°C (-22°F to 140°F), 93 percent RH, noncondensing
Operating acoustic noise	6.2 bels (at 23°C)	Disk drive: Max. 6.0 bels (at 23°C) Removable devices (UniPack): Max. 5.8 bels (at 23°C) Removable devices (FlexiPack): Max. 5.3 bels
Idling acoustic noise	MultiPack, 5.6 bels (at 23°C) MultiPack 2, 5.3 bels (at 23°C)	Disk drive: Max. 5.3 bels (at 23°C) Removable devices (UniPack): Max. 4.7 bels (at 23°C) Removable devices (FlexiPack): Max 4.6 bels
Operating altitude	0 to 10,000 ft. (0 to 3 km)	0 to 10,000 ft. (0 to 3 km)
Non-operating altitude	0 to 40,000 ft. (0 to 12 km)	0 to 40,000 ft. (0 to 12 km)

# System Regulations

The MultiPacks and UniPack pass the following Regulation Rules:

Category	SPARCstorage MultiPack, SPARCstorage MultiPack 2, SPARCstorage UniPack, and SPARCstorage FlexiPack
Safety	UL 1950; CSA-C22.2 No.950-M89; EN 60950; CB-Scheme with Nordic Deviations; Low Voltage Directive (73/23/EEC)
RFI/EMI	47 CFR Part 15, Subpart J; C108.8-M1983; VCCI Requirements; EN 55022; EN 60555-2; EMC Directive (89/336/EEC)
Immunity	EMC Directive (89/336/EEC); IEC 801-2, -3, -4, -5; EN 55082-1
Product label	UL, ULc, GS (TUV), FCC Class B, Canadian Class B, VCCI Class 2, CE

# Software Requirements

## SCSI ID Conflict

The MultiPack and MultiPack 2 have fixed SCSI ID, if you daisy chain additional external devices with a MultiPack on the same SCSI bus, there can be a SCSI ID conflict.

SCSI ID	Device Assigned to SCSI ID
SCSI ID 0	First internal disk on an embedded SCSI interface of SPARCstation™ 4, SPARCstation 5, SPARCstation 20, and Sun™ Ultra™ is assigned to ID 0
SCSI ID 3	First internal disk on platforms earlier than the SPARCstation 4, SPARCstation 5 and SPARCstation 20 is usually assigned to ID 3
SCSI ID 4	Tape drive is usually assigned ID 4
SCSI ID 6	CD-ROM devices are usually assigned ID 6
SCSI ID 7	The initiator (SCSI host adapter) is always address 7 for narrow and wide interfaces
No SCSI ID reserved	No address IDs are reserved for any of the SBus/PCibus SCSI option cards

## MultiPack Under Solaris 2.x Environment

Both MultiPack models are supported on Solaris™ 2.3 and later releases. In order to address SCSI ID 8 and above, a wide on board host or host bus adapter (like the SWIS/S) is required.

When installed with the SWIS/S bus adapter, Solaris 2.3 or later releases are required and require patches. When installed with SunSwift™ host bus adapters, Solaris 2.5 or later releases are required.

# Software Requirements (cont.)

## SPARCstorage FlexiPack Software Requirements

FlexiPack Drive	Solaris 1.x Support	Solaris 2.x Support
4mm DDS-2 Tape Drive 7-14 GB 8mm Tape Drive	Solaris 1.1.1 (SunOS 4.1.3) and later releases	Solaris 2.3 and later releases
4mm DDS-3 Tape Drive 4mm DDS-3 Autoloader SunCD 12	Solaris 1.1.2 and later releases	Solaris 2.4 and later releases
SPARCstorage DLT4000 Tape Drive	N/A	Solaris 2.4 and later releases
20-40 GB 8mm Tape Drive SPARCstorage DLT7000 Tape Drive	N/A	Solaris 2.5 and later releases

All FlexiPack configurations are supported by most of the leading data management software packages such as Solstice Backup.

Please reference applicable documents (i.e. Just The Facts, Product Brief, Customer Presentations, etc...) associated with the specific devices you are using in the SPARCstorage FlexiPack in order to get more detailed information on software requirements for a particular device. These associated documents are available in SunWIN.

## SPARCstorage™ UniPack Software Requirements

The 2.1-GB and 4.2-GB UniPacks are supported on Solaris 1.1.1 (SunOS 4.1.3) and later releases, and Solaris 2.3 and later releases. For fast/wide functionality, the SWIS/S host adapter and Solaris 2.3 or later version is required.

The 9.1-GB UniPack normally requires Solaris 2.3 or later releases. See SPARCstorage™ MultiPack Software Requirements if Solaris 1.1.2 support is required.

The 4 mm DDS-2 tape, 7- to 14-GB 8 mm tape, QIC 2.5-GB and SunCD™ 12 is supported on Solaris 1.1.1 (SunOS 4.1.3) and later releases, and Solaris 2.3 and later releases. The 4 mm DDS-3 tape is supported on Solaris 1.1.2 or Solaris 2.4 and later releases. The 20- to 40-GB 8mm tape is supported on Solaris 2.5 and later releases.

# SPARCstorage™ MultiPack Configuration

## SPARCstorage™ MultiPack, MultiPack 2, FlexiPack, and UniPack Configuration Guidelines

The daisy chain configuration rules will depend on whether you are installing the SPARCstorage™ MultiPack or the MultiPack 2 device, which workstation/server platform host, or which host bus adapter is being used.

Wide SCSI supports up to 15 target devices while narrow SCSI supports up to 7 target devices. In all cases, the total length of the SCSI bus must be taken into account when daisy chaining multiple devices on a bus. The maximum accumulated bus length is six meters. However, in order to operate reliably, you must not exceed the following maximum daisy chain configurations.

External Subsystem Daisy Chain Configurations	UltraSCSI Host or Host Bus Adapter	UltraSPARC Fast/Wide Onboard Hosts	Fast/Wide Host Bus Adapter (SWIS/S <sub>2</sub> SunSwift™)	Fast/Narrow Onboard Hosts	Fast/Narrow Host Bus Adapter
MultiPack		1 MultiPack only	1 MultiPack only	None	None
MultiPack 2	1 MultiPack 2 only *	1 MultiPack 2 + 1 UniPack	2 MultiPack 2 + 1 UniPack	1 MultiPack 2 + 1 UniPack **	1 MultiPack 2 + 1 UniPack **
2.1-GB, 7200-RPM UniPack		3	4	4	4
4.2/1.05-GB UniPack		4	5	4	5
Tape/CD UniPack		4 ***	4 ***	4 ***	4 ***
Tape/CD FlexiPack		4 ***	4 ***	4 ***	4 ***

(\*) This configuration alone permits UltraSCSI performance.

(\*\*) Maximum of seven devices are allowed on a SCSI bus (including the internal devices).

(\*\*\*) When mixing disk and tape devices on a SCSI chain, only two tape devices are allowed.

# SPARCstorage MultiPack Configuration (cont.)

## Available MultiPack SCSI IDs

Depending on how systems are configured, specific SCSI IDs pre-selected in the MultiPack or MultiPack 2 may not be used. SCSI ID 4 and 6 may already be assigned to a CD-ROM or tape drive.

MultiPack	Enclosure SCSI ID	Host SCSI ID	SCSI IDs Remaining
12-drive MultiPack	2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15	7	0, 1, 6
6-drive MultiPack 2	1, 2, 3, 4, 5, 6 or 9, 10, 11, 12, 13, 14	7	0, 8, 9, 10, 11, 12, 13, 14, 15 or 0, 1, 2, 3, 4, 5, 6, 8, 15
Two 6-drive MultiPack 2's	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14	7	0, 8, 15

## SPARCstorage MultiPack SCSI

For fast/wide SCSI functionality, you will need one of the following host adapters: a wide onboard host adapter, a SWIS/S host adapter, or a SunSwift host adapter. For UltraSCSI functionality, you will need: an UltraSCSI onboard host adapter or a US2S host adapter. The SPARCstorage MultiPacks are supported on the following SCSI host adapters as well as all onboard host adapters on currently shipping workstation and server platforms.

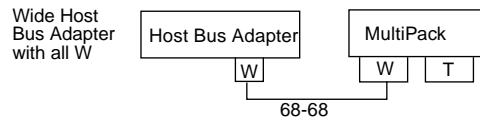
Host Adapters	MultiPack 12 x 2.1 or 4.2 GB	MultiPack 2 6 x 9.1 GB
Onboard fast/narrow HA		✓ Address Switch to 1–6
Onboard fast/wide HA	✓	✓ Address Switch to 1–6
SBus Fast SCSI-2/buffered Ethernet (FSBE/S)		✓ Address Switch to 1–6
SBus SCSI host adapter (SSHA)		✓ Address Switch to 1–6
SBus SCSI/buffered Ethernet (SBE/S)		✓ Address Switch to 1–6
SBUS single-ended, fast/wide, intelligent SCSI-2 (SWIS/S)	✓	✓ Address Switch to 1–6 or 9–14
SunSwift	✓	✓ Address Switch 1–6 or 9–14
US2S	✓	✓ Address Switch 1–6 or 9–14

# SPARCstorage MultiPack Configuration *(cont.)*

## SPARCstorage MultiPack and MultiPack 2 Cabling

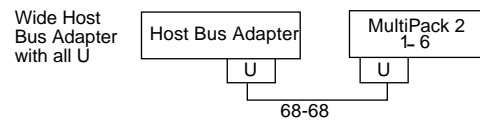
### MultiPack on wide onboard host adapter.

Only one MultiPack drive enclosure can be connected to a single wide SCSI bus.



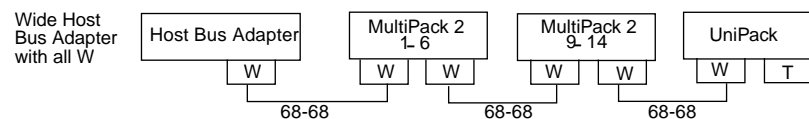
### MultiPack 2 on an UltraSCSI onboard host adapter.

One MultiPack 2 six-drive enclosure can be connected to a single UltraSCSI bus. Select SCSI ID addresses 1–6. For UltraSCSI operation, do not use the external terminator. The on-board autoterminator functions in the UltraSCSI mode.



### MultiPack 2 on a wide onboard host adapter.

Two MultiPack 2 six-drive enclosures can be connected to a single SCSI bus, provided there are no conflicts with internal devices. Select SCSI ID addresses 1–6 and 9–14.



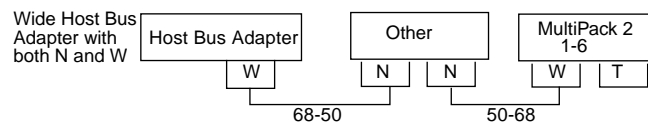


# SPARCstorage MultiPack Configuration *(cont.)*

---

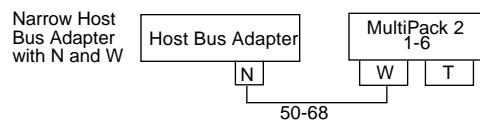
## MultiPack 2 and narrow devices on a fast/wide bus

When mixing MultiPack 2 with a narrow drive or tape device on a wide SCSI bus, chain the narrow devices first with an external terminator on the last device. In general, a 50-68 pin cable will be required (part number X903A for a 1.2 meter or X904A for a 2.0 meter cable).



## Chaining MultiPack 2 to narrow host interfaces

One MultiPack 2 drive enclosure may be chained to a narrow host adapter. The address select switch must be set to 1-6 and a 50-68 pin cable is required.



# SPARCstorage™ FlexiPack Configuration

## SPARCstorage™ FlexiPack Configuration Guidelines

The SPARCstorage FlexiPack has certain restrictions with respect to host adapters and cables.

## SPARCstorage FlexiPack SCSI Host Adapters Support

The SPARCstorage FlexiPack products are supported on the following SCSI host adapters as well as all onboard host adapters on currently shipping workstation and server platforms.

For fast/wide SCSI functionality, the SWIS/S host adapter is required. The 4mm tape drives and autoloader, 7-14 GB 8mm tape drive, SPARCstorage DLT4000 tape drive, and SunCD 12 will be supported on the SWIS/S card with Solaris 2.5, but will still run in narrow mode.

## SPARCstorage FlexiPack Cabling

All FlexiPack products may be ordered with either a 68-68 pin or 50-68 pin SCSI cable. Cabling guidelines are as follows.

- 68-68 pin Cable Connection

The 68-68 pin SCSI cable allows connections to other FlexiPacks, UniPacks, or a fast/wide host adapter (SWIS/S or SunSwift). Always connect the fast/wide devices first when using a 68-pin host adapter.

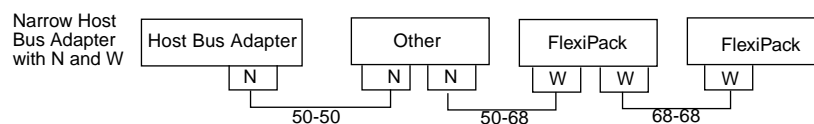
When cabling fast/narrow devices on a Wide bus, the 50-pin devices should be cabled last and need to be actively terminated.

- 50-68 pin Cable Connection

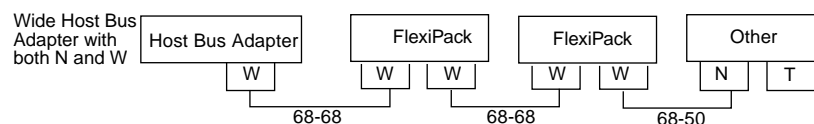
The 50-68 pin SCSI cable allows connections to

- 50-pin onboard host adapters offered on some current desktop products or
- The older 50-pin storage enclosures

When cabling a daisy chain of fast/narrow SCSI devices and FlexiPacks to a narrow (50-pin) onboard host adapter, always put the FlexiPacks at the end of a SCSI chain. This provides auto-termination to the SCSI bus.



When cabling devices to a fast/wide host adapter with fast/wide and fast/narrow devices on a SCSI chain, chain the fast/wide devices first. The last device on a bus needs to be actively terminated. Use a 50-68 pin cable to connect fast/wide (68-pin) to a fast/narrow (50-pin) device.



# SPARCstorage™ UniPack Configuration

## SPARCstorage™ UniPack SCSI Host Adapters Support

The SPARCstorage UniPack products are supported on the following SCSI host adapters as well as all onboard host adapters on currently shipping workstation and server platforms.

For fast/wide SCSI functionality, the SWIS/S host adapter is required. The 2.5-GB QIC, 4 mm tape, 8 mm tape, and SunCD™ 4 will be supported on the SWIS/S card with Solaris™ 2.5, but will still run in narrow mode.

## SPARCstorage UniPack Cabling

All UniPack products may be ordered with either a 68-68 pin or 50-68 pin SCSI cable. Cabling guidelines are as follows:

### 68-68 pin Cable Connection

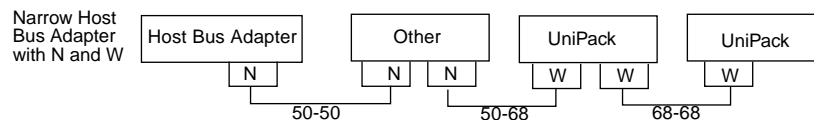
The 68-68 pin SCSI cable allows connections to other UniPacks or a fast/wide host adapter (SWIS/S or SunSwift). Always connect the fast/wide devices *first* when using a 68-pin host adapter. When cabling fast/narrow devices on a wide bus, the 50-pin devices should be cabled last and need to be actively terminated.

### 50-68 pin Cable Connection

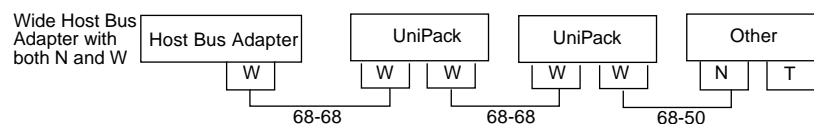
The 50-68 pin SCSI cable allows connections to

- 50 pin onboard host adapters offered on the current desktop products or
- The older 50 pin storage enclosures

When cabling a daisy chain of fast/narrow SCSI devices and UniPacks to a narrow (50-pin) onboard host adapter, always put the UniPacks at the end of a SCSI chain. This provides auto-termination to the SCSI bus.



When cabling devices to a fast/wide host adapter with fast/wide and fast/narrow devices on a SCSI chain, chain the fast/wide devices first. The last device on a bus needs to be actively terminated. Use a 50-68 pin cable to connect fast/wide (68-pin) to a fast/narrow (50-pin) device.



# SPARCstorage Configuration Cable Lengths

## System Internal Cable Lengths

The following table lists the internal cable lengths of supported systems.

Product	Cable Length (meter)
SPARCstorage UniPack disk	0.3 meter
SPARCstorage UniPack tapes and CD	0.4 meter
SPARCstorage FlexiPack with DLT7000, DLT4000 or DDS-3 Autoloader	0.6 meter
SPARCstorage FlexiPack (all other devices)	0.8 meter
SPARCstorage MultiPack, MultiPack 2	0.9 meter
Desktop disk pack	0.3 meter
Desktop storage disk pack	0.3 meter
Sun <sup>™</sup> Ultra <sup>™</sup> Systems	0.9 meter
SPARCstation <sup>™</sup> 5	1.6 meter (was 0.9 meter)
SPARCclassic <sup>™</sup>	1.6 meter (was 0.7 meter)
Other desktops	~ 0.9 meter
SBus Cards , SunSwift PCI	0.1 meter
2 channel PCI adapter	0.2 meter
Interconnect cables	0.3 to 2.0 meters

# MultiPack Ordering Information

## SPARCstorage™ MultiPack and MultiPack 2 Marketing Part Numbers

Part Number	Option Description	Maximum Number Supported	Comments
X5511A	SPARCstorage MultiPack, 2 x 2.1-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X5512A	SPARCstorage MultiPack, 6 x 2.1-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X5513A	SPARCstorage MultiPack, 12 x 2.1-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X5514A	SPARCstorage MultiPack, 2 x 4.2-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X5515A	SPARCstorage MultiPack, 6 x 4.2-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X5516A	SPARCstorage MultiPack, 12 x 4.2-GB, 7200-RPM, Fast/Wide SCSI-2 drives	1	On wide SCSI bus
X6527A	SPARCstorage MultiPack 2, 2 x 9.1-GB, 7200-RPM, UltraSCSI drives	2	On wide SCSI bus
X6528A	SPARCstorage MultiPack 2, 4 x 9.1-GB, 7200-RPM, UltraSCSI drives	2	On wide SCSI bus
X6529A	SPARCstorage MultiPack 2, 6 x 9.1-GB, 7200-RPM, UltraSCSI drives	2	On wide SCSI bus

# FlexiPack Ordering Information

## SPARCstorage™ FlexiPack Marketing Part Numbers

Part Number	Option Description	Maximum Drives per FlexiPack
X6060A	SPARCstorage FlexiPack, DLT7000, with 68-68 pin cable	1
X6061A	SPARCstorage FlexiPack, DLT7000 with 50-68 pin cable	1
X6057A	SPARCstorage FlexiPack, DLT4000 with 68-68 pin cable	1
X6058A	SPARCstorage FlexiPack, DLT4000 with 50-68 pin cable	1
X6232A	SPARCstorage FlexiPack, 20-40-GB 8mm tape drive with 68-68 pin cable	2
X6233A	SPARCstorage FlexiPack, 20-40-GB 8mm tape drive with 50-68 pin cable	2
X6210A	SPARCstorage FlexiPack, 7-14-GB 8mm tape drive with 68-68 pin cable	2
X6211A	SPARCstorage FlexiPack, 7-14-GB 8mm tape drive with 50-68 pin cable	2
X6290A	SPARCstorage FlexiPack, 4mm DDS-3 autoloader with 68-68 pin cable	1
X6291A	SPARCstorage FlexiPack, 4mm DDS-3 autoloader with 50-68 pin cable	1
X6284A	SPARCstorage FlexiPack, 4mm DDS-3 tape drive with 68-68 pin cable	2
X6285A	SPARCstorage FlexiPack, 4mm DDS-3 tape drive with 50-68 pin cable	2
X6263A	SPARCstorage FlexiPack, 4mm DDS-2 tape drive with 68-68 pin cable	2
X6264A	SPARCstorage FlexiPack, 4mm DDS-2 tape drive with 50-68 pin cable	2
X6159A	SPARCstorage FlexiPack, 12X CD-ROM drive with 68-68 pin cable	2
X6160A	SPARCstorage FlexiPack, 12X CD-ROM drive with 50-68 pin cable	2

# UniPack Ordering Information

## SPARCstorage™ UniPack Marketing Part Numbers

Part Number	Option Description
X5151A	SPARCstorage UniPack, 2.1-GB, 7200-RPM, 68 to 68-pin SCSI cable
X5152A	SPARCstorage UniPack, 2.1-GB, 7200-RPM, 50 to 68-pin SCSI cable
X5209A	SPARCstorage UniPack, 4.2-GB, 7200-RPM, 68 to 68-pin SCSI cable
X5213A	SPARCstorage UniPack, 4.2-GB, 7200-RPM, 50 to 68-pin SCSI cable
X5253A	SPARCstorage UniPack, 9.1-GB, 7200-RPM, 68 to 68-pin SCSI cable
X5254A	SPARCstorage UniPack, 9.1-GB, 7200-RPM, 50 to 68-pin SCSI cable
X6230A	SPARCstorage UniPack, 20-40-GB 8mm tape drive with 68-68 pin cable
X6231A	SPARCstorage UniPack, 20-40-GB 8mm tape drive with 50-68 pin cable
X6208A	SPARCstorage UniPack, 7-14-GB 8mm tape drive with 68-68 pin cable
X6209A	SPARCstorage UniPack, 7-14-GB 8mm tape drive with 50-68 pin cable
X6280A	SPARCstorage UniPack, 4mm DDS-3 tape drive with 68-68 pin cable
X6281A	SPARCstorage UniPack, 4mm DDS-3 tape drive with 50-68 pin cable
X6261A	SPARCstorage UniPack, 4mm DDS-2 tape drive with 68-68 pin cable
X6262A	SPARCstorage UniPack, 4mm DDS-2 tape drive with 50-68 pin cable
X6157A	SPARCstorage UniPack, 12X CD-ROM drive with 68-68 pin cable
X6158A	SPARCstorage UniPack, 12X CD-ROM drive with 50-68 pin cable
X6101A	SPARCstorage UniPack, QIC tape drive with 68-68 pin cable
X6102A	SPARCstorage UniPack, QIC tape drive with 50-68 pin cable

# MultiPack Options

## SPARCstorage™ MultiPack Drive and Cable X-options

Part Number	Option Description	Maximum Number Supported	Comments
X6520A	2.1-GB, 7200-RPM, internal x-option disk drive	10	Plus the first two installed drives
X5214A	4.2-GB, 7200-RPM, internal x-option disk drive	10	Plus the first two installed drives
X5251A	9.1-GB, 7200-RPM, internal x-option disk drive	4	Plus the first two installed drives
X902A	68-68 pin 2.0 meter, external SCSI cable	–	
X903A	50-68 pin 1.2 meter, external SCSI cable	–	
X904A	50-68 pin 2.0 meter, external SCSI cable	–	

### Configuration Guidelines

- SPARCstorage™ MultiPack, 2 drive subsystem may be expanded with up to ten additional X6520A or 5214A 1-inch high x-option drives. The 9.1-GB, 7200-RPM, x-option drives cannot be installed in the SPARCstorage MultiPack drive enclosure.
- SPARCstorage MultiPack 2, 2 x 9.1-GB subsystem may be expanded with up to four additional X5251A 1.6-inch high x-option drives. The 1-inch high 2.1-GB or 4.2-GB, x-option drives cannot be installed in the SPARCstorage MultiPack 2 drive enclosure
- The 50-68 pin cables are required when chaining the MultiPack or MultiPack 2 to a narrow onboard host adapter or another external 50-pin connector device (i.e. desktop storage module tape drive).



# FlexiPack Options

## Configuration Guidelines

The FlexiPack enclosure is initially configured with one of the following options:

- One DLT7000
- One DLT4000
- One 72-144-GB 4mm DDS-3 autoloader
- One 12-24-GB 4mm DDS-3 tape drive with Sun-light-grey standard bezel and an open bay with filler panel in Sun-light-grey
- One 4-8-GB 4mm DDS-2 tape drive with Sun-light-grey standard bezel and an open bay with filler panel in Sun-light-grey
- One 20-40-GB 8mm tape drive with Sun-light-grey standard bezel and an open bay with filler panel in Sun-light-grey
- One 7-14-GB 8mm tape drive with Sun-light-grey standard bezel and an open bay with filler panel in Sun-light-grey
- One 12X CD-ROM with Sun-light-grey vendor bezel and an open bay with filler panel in Sun-light-grey

The option with 68-68 pin cables is required when chaining the FlexiPack to a fast/wide onboard host adapter (like most Sun workstations and servers) or another external 68-pin connector device (i.e. other FlexiPack, UniPack, or MultiPack devices).

The option with 50-68 pin cables is required when chaining the FlexiPack to a narrow onboard host adapter or another external 50-pin connector device (i.e. Desktop Storage Module tape drive).

The half-height drives in a SPARCstorage FlexiPack base configuration are always installed in the lower storage bay of the FlexiPack with the upper storage bay being open (no drive installed) and covered by a filler panel. This open bay can be filled by another half-height drive thereby fully populating the SPARCstorage FlexiPack. The options available for this upper storage bay are listed below.

## SPARCstorage™ FlexiPack Options for the Upper Storage Bay

The following X-options are for use in the available upper storage bay of the SPARCstorage FlexiPack. When ordering the SPARCstorage FlexiPack with a half-height drive, the option includes the enclosure plus 1 drive located in the lower storage bay. The upper storage bay is covered by a filler panel initially, but you can order any of the following field-installable options for use in the upper storage bay:

Part Number	Option Description
X6265A	4mm DDS-2 internal tape drive
X6282A	4mm DDS-3 internal tape drive
X6161A	Internal SunCD 12 (12X CD-ROM Drive)
X6212A	7-14 GB 8mm internal tape drive
X6236A	20-40 GB 8mm internal tape drive

# SunSpectrum<sup>SM</sup> Customer Service Program

SunSpectrum<sup>SM</sup> support programs are designed to meet customers' complete system needs, from total business support to self-maintenance and any level in-between. The SunSpectrum program supports a flexible range of services, allowing customers complete systems coverage for hardware, software, network applications, and network interoperability problems. A single fee covers the support for customers' entire systems—no matter what the configuration—making ordering and support administration easy. Customers should check with their local customer support representative for program/feature variance and availability in their area.

Services	SunSpectrum Platinum <sup>SM</sup> program	SunSpectrum Gold <sup>SM</sup> program	SunSpectrum Silver <sup>SM</sup> program	SunSpectrum Bronze <sup>SM</sup> program
Telephone assistance, unlimited	Seven-day, 24 hour	Seven-day, 24-hour	8AM-8PM, M-F	8AM-5PM, M-F
On-site response	Seven-day, 24-hour	8AM-8PM, M-F	8AM-5PM, M-F	
Customer-defined priority	✓	✓	✓	
Urgent (phone/on site)	Live/two hour	Live/four hour	Live/four hour	Four hour/NA
Serious (phone/on site)	Two hour/four hour	Two hour/next day	Two hour/next day	Four hour/NA
Noncritical (phone/on site)	Four hour/customer convenience	Four hour/customer convenience	Four hour/customer convenience	Four hour/NA
Remote dial-in analysis	✓	✓	✓	✓
Replacement hardware parts	On-site technician	On-site technician	On-site technician	Courier, two business days
Solaris <sup>TM</sup> enhancement releases	✓	✓	✓	✓
Patches and maintenance releases	✓	✓	✓	✓
SunSolve <sup>TM</sup> license	✓	✓	✓	✓
SunSolve EarlyNotifier <sup>SM</sup> Service	✓	✓	✓	✓
Seven-day, 24-hour telephone coverage	✓	✓	Option	
Seven-day, 24-hour on-site coverage	✓	Option	Option	
Two-hour on-site response	✓	Option	Option	
Self-paced education library	✓	✓	Option	
Personal technical acct. support	✓	✓	Option	
On-site technical support reviews	Quarterly	Semiannual	Option	
Technical support plan	✓			
99% server uptime guarantee	✓			
Coaching and training service	15 days per year			
Additional contacts	Option	Option	Option	Option
Unbundled software enhancement releases	Option	Option	Option	Option
On-site support (dedicated)	Option			

# Glossary

Active Termination, Regulated	Terminates the SCSI bus with a series of resistors tied to +5 Volts. The terminator is labeled <i>Regulated</i> but is often referred to as <i>Active Terminator</i> .
Bandwidth	A measure of the capacity of a communication channel, usually specified in MB/sec.
DSBE/S	SBus fast Differential SCSI-2/buffered Ethernet card
DWIS/S	SBus Differential fast/wide Intelligent SCSI-2 host adapter
Fast SCSI	Data transfer rate of 10 MB/sec
Fast/wide SCSI	Data transfer rate of 20 MB/sec. Wide devices can be connected to a standard SCSI interface but the extra data lines need to be terminated.
FSBE/S	Fast SCSI Buffered Ethernet
GB	A disk GB is 1 billion (1,000,000,000) bytes. A memory GB is 1,073,741,824 bytes (2 to the 30 <sup>th</sup> power).
GUI	Graphical user interface. The SPARCstorage™ Volume Manager provides a powerful, easy-to-use GUI.
Host adapter	A device that connects a peripheral device I/O protocol and medium to the computer system's I/O bus.
Hot-Plug	The ability to remove, replace or add a device while current I/O processes continue on the bus.
Hot Spare	A drive in an array that is held in reserve to replace any other drive that fails.
Hot-Swap	The specific case of hot plug which involves replacing a device with another of the same size, type, and layout.
IOPS	Input/output operations per second. A measure of I/O performance, this is usually used to quote random I/O performance. See throughput.
MTBF	Mean time between failures. A measure of reliability, this is the average expected time between failures of equipment, usually measured in operating hours.
Multi-Disk Pack	SCSI disk enclosure that can accommodate up to four 3.5-inch disk drives.
RAID	Redundant array of independent disks, a set of disk drives that appears to be a single logical disk drive to an application such as a database or file system. Different RAID levels provide different capacity, performance, high availability, and cost characteristics.
Release	A SCSI command to release a previously granted reservation. See Reserve.
Reserve	A SCSI command issued by a host system to reserve access to a controller or disk drive. Once a reservation is granted to a system, commands to the controller or disk drive by any other system are rejected. This is a valuable safety feature in dual-hosted SPARCstorage Array configurations.
SBE/S	SCSI controller 5-MB/sec transfer rate

## Glossary (cont.)

---

SCSI Address	The octal representation of the unique address (0–7) assigned to a narrow device; or hex representation of the unique address (0–15) assigned to a wide SCSI device.
Single Connector	A SCSI disk connector technology co-invented by Sun Microsystems. The Single Connector Attachment (SCA) provides all SCSI, power, and control signals in a single connector, and enables easy servicing and highly reliable, pluggable disk drives.
SSHA	SBUS SCSI host adapter
SWIS/S	Single-ended wide intelligent SCSI.
Throughput	A measure of sequential I/O performance, quoted in MB/sec. See IOPS.
Volume	In the SPARCstorage Volume Manager, a volume is a virtual disk partition into which a file system, DBMS, or other application can place data. A volume can physically be a single disk partition or multiple disk partitions on one or more physical disk drives. Applications that use volumes do not need to be aware of their underlying physical structure. The Volume Manager handles mapping of virtual partition addresses to physical addresses.
Warm Plug	The ability to remove, replace or add a device while power is still applied only while all I/O processes are suspended.

# Materials Abstract

All materials are available on SunWIN, except where noted otherwise.

Collateral	Token # or Hibbert order #	Description	Purpose	Distribution
<b>References</b>				
<i>SPARCstorage™ MultiPack, FlexiPack, and UniPack Just the Facts</i>	50843			
<i>20-40 GB, 8mm Tape Drive and 400-800 GB SPARCstorage Library Model 8/400: Just The Facts</i>	63810	Reference guide	Training	SunWIN
<i>4mm DDS-3 Tape Drive and Autoloader: Just The Facts</i>	59386			
Sun™ Intro – SPARCstorage MultiPack	50889			
Sun Intro – SPARCstorage MultiPack 2	70006			
Sun Intro – SPARCstorage FlexiPack	64361			
Sun Intro – SPARCstorage UniPack	46150			
Sun Intro - SPARCstorage DLT7000 Tape Drive	64363			
Sun Intro - SPARCstorage DLT4000 Tape Drive	50899			
Sun Intro – New 20-40 GB 8mm Tape Drive	57902	Introduction e-mail	Training	E-mail, SunWIN, Reseller Resource CD
Sun Intro – New 14 GB 8mm Tape Drive	64364			
Sun Intro – New 4mm DDS-3 Tape Drive	59178			
Sun Intro – New 4mm DDS-2 Tape Drive	64357			
Sun Intro - New SunCD 12 CD-ROM Drive	63431			
Sun Intro - 2.5GB QIC Tape Drive	46162			

## Materials Abstract (*cont.*)

Collateral	Token # or Hibbert order #	Description	Purpose	Distribution
<b>Training</b> SPARCstorage MultiPack Training	TBD			
SPARCstorage UniPack Training	45363	Training guide	Training	SunWIN
<b>Product literature</b> SPARCstorage MultiPack Product Brief	50845	Two-page product information	Sales tool	SunWIN
SPARCstorage MultiPack Datasheet	66769	Datasheet	Sales tool	SunWIN
SPARCstorage UniPack Product Brief	46703	Two-page product information	Sales tool	SunWIN
SPARCstorage UniPack Datasheet	66767	Datasheet	Sales tool	SunWIN
Sun's 3.5-inch SCSI Disk Product Brief	8502			
SPARCstorage DLT4000, DLT7000 and DLT4700 Product Brief	51067			
10 GB/14 GB 8mm Tape Drive Product Brief	35735			
20-40 GB 8mm Tape Drive and 400-800 GB 8mm SPARCstorage Library Model 8/400 Product Brief	57603	Two-page product information	Sales tool	SunWIN
4-8 GB 4mm DDS-2 Tape Drive Product Brief	50130			
12-24 GB 4mm DDS-3 Tape Drive and 72-144 GB 4mm DDS-3 Autoloader Product Brief	62061			
2.5 GB QIC Tape Drive Product Brief	47933			